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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/553,245	10/17/2005	Xiaonan Li	NREL-01-43	6989
Paul J White NREL 1617 Cole Boulevard Golden, CO 80401			EXAMINER COLEMAN, WILLIAM D	
			ART UNIT 2823	PAPER NUMBER
			MAIL DATE 08/28/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/553,245

**Applicant(s)**

LI ET AL.

**Examiner**

W. David Coleman

**Art Unit**

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16-19 is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date 10/05

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

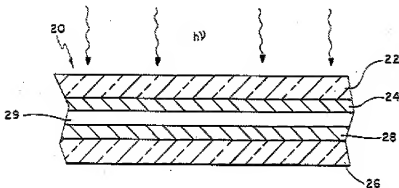
1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2 3, 4, 5, 6 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Gay U.S. Patent 4,638,111.

Gay discloses a semiconductor process as claimed. See FIGS. 1-6, where Gay teaches the following limitations.



Pertaining to claim 1, Gay teaches a process of using chemical vapor deposition for producing transparent p-type conducting oxide films without co-doping, plasma enhancement or the use of high temperature, comprising:

(a) introducing a dialkylmetal (see column 6, line 57) at ambient temperature (see column 5, lines 49-57) in a carrier gas into a low pressure deposition chamber; and

(b) introducing NO alone or with an oxidizer into said chamber under an environment sufficient to produce a metal-rich condition to enable NO decomposition and atomic nitrogen incorporation into the formed transparent metal conducting oxide (please note that since Gay teaches the use of nitric oxide, nitrous oxide and nitrogen dioxide it is well known that fractional percentages of nitrogen will be incorporated into the zinc oxide film); said dialkyl is selected from the group consisting of dimethyl (see column 6, line 58) and diethyl.

Pertaining to claim 2, Gay teaches the process of claim 1 wherein said metal is selected from the group consisting of Zn, Cd, In, Sn, Ga and alloys thereof.

Pertaining to claim 3, Gay teaches the process of claim 2, wherein said transparent conducting oxide is selected from the group consisting of ZnO, CdO, In<sub>2</sub>O<sub>3</sub>, SnO<sub>2</sub>, Ga<sub>2</sub>O<sub>3</sub> and alloys thereof.

Pertaining to claim 4, Gay teaches the process of claim 3 wherein said carrier gas is selected from the group consisting of N<sub>2</sub> or Ar.

Pertaining to claim 5, Gay teaches the process of claim 4, wherein step b) NO is introduced alone.

Pertaining to claim 6, Gay teaches the process of claim 5 wherein NO is introduced with an oxidizer.

Pertaining to claim 7, Gay teaches the process of claim 6, wherein said oxidizer is O<sub>2</sub>.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 8-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gay, U.S. Patent 4,638,111.

Gay teaches a semiconductor process substantially as claimed. However, Gay teaches a deposition temperature of about 25°-90° C and a chamber pressure of about 5 to 20 torr (see column 5, lines 56-57). Gay also teaches wherein the total gas flow through the chamber is 5 SCCM to 100 SCCM per square foot of deposition surface. Gay does not teach the specific process parameters as claimed by Applicant. Applicant has not disclosed that having these specific parameters solves any stated problem. Moreover, it appears that the process parameters of Gay would result as claimed by Applicants. Accordingly, the process parameters of the claimed invention by Applicants is deemed to be a design consideration which fails to patentably distinguish over the prior art of Gay. Given the teaching of the references, it would have been obvious to determine the optimum thickness, temperature as well as condition of delivery of the layers involved. See *In re Aller, Lacey and Hall* (10 USPQ 233-237) "It is not inventive to discover optimum or workable ranges by routine experimentation. Note that the specification

contains no disclosure of either the critical nature of the claimed ranges or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Any differences in the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ to such an extent that the difference is really unexpected. *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986)

Appellants have the burden of explaining the data in any declaration they proffer as evidence of non-obviousness. *Ex parte Ishizaka*, 24 USPQ2d 1621, 1624 (Bd. Pat. App. & Inter. 1992).

An Affidavit or declaration under 37 CFR 1.132 must compare the claimed subject matter with the closest prior art to be effective to rebut a prima facie case of obviousness. *In re Burckel*, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979).

#### ***Allowable Subject Matter***

5. Claims 16-19 allowed.
6. The following is an examiner's statement of reasons for allowance: the prior art does not anticipate nor render obviousness as to a p-type transparent conducting oxide film without co-doping incorporating nitrogen at over about 2 atomic percent.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is 571-272-1856. The examiner can normally be reached on Monday-Friday 9:00 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

W. David Coleman  
Primary Examiner  
Art Unit 2823

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